

A study of referrals to public health agencies among 1,263 households showed that the majority of the time and patient-nurse contacts are devoted to the first patient, and usually less than two additional patients come from the same household.

Public Health Nursing Service Provided in Households

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THE AMOUNT of public health nursing service needed by patients under the care of local health departments has been the subject of much speculation, the topic of many conferences, formal and informal, and the research objective of various studies. This report deals with one aspect of the problem—the amount of public health nursing service that ensues in a household as a result of the referral of the first patient.

Source of Data

The basic data for this report were collected by 2 nurses in each of 8 health agencies in 5 States over a period of 2 years. The agencies were the Frederick County Health Department, Maryland; Detroit Department of Health and Washtenaw County Health Department, Michigan; Rochester Health Bureau and Tompkins County Health Department, New York; Forsyth County Health Department, North Carolina; and the Fredericksburg Health District and the Community Nursing Service of Richmond, Virginia.

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These agencies met the criteria of the American Public Health Association for health department programs, and the nurses fulfilled the criteria of the American Nurses' Association and the National League for Nursing for public health nursing programs, staffing patterns, and basic public health nursing preparation of the staff. These agencies and nurses also were ones that, in the professional judgment of the responsible State health officials, were maintaining standards of good public health practice (1).

Households in this study comprised all persons living in one dwelling unit, such as an apartment or a private dwelling, but did not include family members living elsewhere. Beginning with referrals on February 1, 1954, each nurse admitted for study the households of the first 10 patients referred in each category of service where the agency assumed responsibility. Thereafter, she recorded, among many other items, the amount of service provided to all members of the household from the time of referral to discharge or for a period of 1 year, whichever came first.

The participating agencies provided services in all areas usually considered health department responsibility, but the number and type of categories used in reporting service varied considerably from agency to agency. Because

of this variation, all initial patients and their corresponding households were reclassified by the study staff for purposes of uniformity. As a result, some categories used in this report have more than 160 initial patients and households. Many have fewer than 160 initial patients, partially because of the reclassification, but mainly because fewer than the desired number of patients were referred to the individual nurse during the year when field data were collected.

In all, 1,263 households were studied. They included 5,779 members, 2,984 of whom received service from the public health nurse. Forty-two percent of the initial patients in these households were referred for nursing service by various divisions of the health department itself. Private physicians and hospitals referred 22 percent, while the patient or his family accounted for 16 percent. School referrals amounted to 11 percent; all other sources, 9 percent.

For tuberculosis, infant health supervision, and maternity, most referrals came from the health department. The patient and family were also frequent sources of referral for maternity and infant health supervision. Referrals from physicians were more numerous in noncommunicable disease, chronic illness, and tuberculosis than in other categories. The school referrals were mostly of school-age children for physical defects or for behavior or emotional problems.

Index of Additional Patients

Referral of the initial patient in a household has been assumed to lead to service for other members of the family. This is one of the bases for advocating generalized public health nursing service. In this study, service to other members of the households is demonstrated by the ratio of the number of additional patients to the number of initial patients. The resulting index simply describes the average number of added patients per a first referral.

The index of additional patients varies from one service category to another (table 1). When the initial referral was classified as tuberculosis, the index was 2.0 which means that, on the average, 2 patients in addition to the initial patient in the household received service. This was the

highest index. The lowest index, 0.5, occurred when the initial referral was venereal disease.

The magnitude of the index, or the number of additional patients per household, appears to be virtually independent of the size of household and related primarily to the category of the initial patient. For example, households initially admitted as tuberculosis averaged 4 members, 77 percent of whom became patients (index 2.0). In the mental health category, however, households were larger on the average, 4.7 members, but only 38 percent of the members became patients (index 0.8).

The index based on all households and their patients has been omitted purposely from table 1. The households studied were not selected with the view that they would reflect a total caseload. They were selected, instead, to reflect what occurred within a service category. Consequently, all figures derived from the basic data must be considered by category only.

Service Categories of Additional Patients

When service categories were considered separately, additional patients were usually in categories different from that of the initial patient (table 2). The greatest exception was in the tuberculosis category where 82 percent of the added patients were also classified as tuberculosis. This exception is easily understood because the category includes suspects and contacts as well as cases of tuberculosis. Similarly, 58 percent of the additional patients resulting from a venereal disease referral and 42 percent of those from a communicable disease referral were in the same category as the initial patient.

Subcategories in health supervision are determined by the age of the patient. This accounts for most of the additional patients being in a different group than that of the initial patient. For example, only 3.7 percent of the additional patients resulting from an initial referral for infant health supervision were in the same category. This is to be expected. Few households include two infants simultaneously or over a short period of time.

Because of the age factor in health supervision and because child health supervision is usually associated with maternity service, a broader grouping including health supervision

and maternity was made. With these categories grouped, 89.5 percent of the additional patients were in this larger category.

Patient-Nurse Contacts

In previous studies, terms such as interview, visit, and conference have been used to identify

the services given by the public health nurse to or in behalf of the patient. Because specific and often diametrically opposed definitions of these terms have been developed to meet particular needs in various situations, they are not used in this report. Instead, a term "patient-nurse contact" (PNC) has been employed. This term covers all services to or in behalf of the

Table 1. Index of additional patients

Category of initial patient	Average household size	Number of initial patients (households)	Number of additional patients	Percent ¹ patients	Index ²
Orthopedic.....	4.8	64	67	42.4	1.0
Chronic disease ³	3.7	126	89	46.1	.7
Communicable disease.....	5.3	92	102	39.9	1.1
Tuberculosis.....	4.0	178	365	76.6	2.0
Venereal disease.....	3.7	36	19	41.7	.5
Infant.....	4.7	230	348	53.7	1.5
Preschool.....	5.3	47	81	51.2	1.7
School.....	5.3	71	64	36.1	.9
Adult health.....	5.5	4	7	50.0	1.7
Antepartum.....	5.1	160	279	54.2	1.7
Postpartum.....	4.6	111	183	57.9	1.6
Mental health.....	4.7	71	55	38.0	.8
Noncommunicable disease.....	4.2	73	62	44.4	.8

¹ Total patients in household/total persons in household.
² Number of additional patients/number of initial patients.
³ Includes cancer, cardiovascular, and other chronic diseases.

Table 2. Relation of category of additional patients to that of initial patient

Category of initial patient	Number of initial patients	Additional patients in households				
		Total	Same category as initial patient		Different category from initial patient	
			Number	Percent	Number	Percent
Health supervision and maternity service.....	623	962	861	89.5	101	10.5
Infant.....	230	348	13	3.7	335	96.3
Preschool.....	47	81	22	27.2	59	72.8
School.....	71	64	7	10.9	57	89.1
Adult health.....	4	7	1	14.3	6	85.7
Antepartum.....	160	279	3	1.1	276	98.9
Postpartum.....	111	183	0	0	183	100.0
Communicable diseases.....	306	486	360	74.1	126	25.9
Tuberculosis.....	178	365	298	81.6	67	18.4
Venereal disease.....	36	19	11	57.9	8	42.1
Others.....	92	102	43	42.2	59	57.8
All others.....	334	273	59	21.6	214	78.4
Chronic disease ¹	126	89	9	10.1	80	89.9
Orthopedic.....	64	67	3	4.5	64	95.5
Noncommunicable disease.....	73	62	10	16.1	52	83.9
Mental health.....	71	55	9	16.4	46	83.6

¹ Includes cancer, cardiovascular, and other chronic diseases.

Table 3. Patient-nurse contacts per household referral

Category of initial patient	Number of patient-nurse contacts per household					Percent	
	Total	Initial patients	Additional patients	Average for each additional patient	Ratio initial patient to additional patients	Initial patient	Additional patients
Orthopedic.....	14.3	10.8	3.5	3.3	3.3	75.5	24.5
Chronic disease ¹	24.8	21.5	3.3	4.6	4.7	86.7	13.3
Communicable disease.....	12.3	6.0	6.3	5.7	1.1	48.8	51.2
Tuberculosis.....	23.5	14.2	9.3	4.5	3.2	60.4	39.6
Venereal disease.....	7.9	6.0	1.9	3.6	1.7	75.9	24.1
Infant.....	11.2	6.3	4.9	3.3	1.9	56.2	43.8
Preschool.....	11.7	4.7	7.0	4.0	1.2	40.2	59.8
School.....	11.7	7.5	4.2	4.7	1.6	64.1	35.9
Adult health.....	17.5	11.0	6.5	3.7	3.0	62.9	37.1
Antepartum.....	19.2	10.7	8.5	4.9	2.2	55.7	44.3
Postpartum.....	13.5	5.0	8.5	5.1	1.0	38.5	61.5
Mental health.....	15.4	11.6	3.8	4.8	2.4	75.3	24.7
Noncommunicable disease.....	13.9	10.7	3.2	3.7	2.9	77.0	23.0

¹ Includes cancer, cardiovascular, and other chronic diseases.

patient, regardless of the place of service (such as home, office, or clinic), the other person involved (such as patient, social agency representative, or physician), or the means (such as home call, telephone, or letter).

The number of patient-nurse contacts was considered by household, initial patient, additional patients as a group, and individual additional patients (table 3). This table shows that the greatest number of PNC's to a household (24.8) occurred when the initial referral was classified as cancer, cardiovascular disease, or other chronic disease. Also, 87 percent of the patient-nurse contacts in this group were for the initial patient. At the other extreme, only 7.9 PNC's per household were made when the initial referral was classified as venereal disease.

One special point of interest is found in the field of child health supervision. When only the total PNC's to a household are considered, the age of the initial patient makes little difference. When the initial patient was an infant, 11.2 patient-nurse contacts per household were recorded; when a preschool or school child was referred, 11.7 PNC's were made.

In all but three categories (communicable disease, preschool health supervision, and postpartum), the initial patient received more than half of the total PNC's. Furthermore, in all categories except one (postpartum) the average number of patient-nurse contacts to initial

patients exceeded the average number for individual additional patients. In fact, in seven categories, the average number of PNC's to the initial patient was more than double that for individual additional patients. In the postpartum category, the initial patients averaged 5.0 patient-nurse contacts and additional patients, practically all of whom were children, averaged 5.1 (table 3).

Whether reporting under study conditions differs from routine reporting is always a question in any study such as this. A limited answer to this question was obtained by pooling the annual reports of the participating agencies and comparing these data with those of the study. The annual reports provided the number of patient-nurse contacts per patient in the home setting. Similar averages were

Table 4. Home patient-nurse contacts per patient

Category of service	Study	Pooled annual reports
Chronic disease, orthopedic, and noncommunicable disease.....	7.6	8.6
Communicable disease and venereal disease.....	2.8	2.1
Tuberculosis.....	3.8	4.0
Maternity.....	4.4	3.0
Health supervision.....	3.4	3.2

obtained from the study data on contacts occurring in the home (table 4). A comparison of the several averages suggests that the number of patient-nurse contacts in the home was neither over-reported nor under-reported by the nurses who provided the basic data.

Time for Patient-Nurse Contacts

Time spent in giving nursing service is even more important than the frequency of service in relation to an agency's personnel needs or the setting of priorities within an agency. In this study, nurses reported the time required for actual service. Travel time was excluded because it varies with local geography and means of transportation. The time reported included both preactivity and postactivity as well as the time spent in giving direct service. In other words, total time included that spent in reviewing the patients' records, collecting literature or other supplies, packing nurse's bag, recording on the patients' records, and similar activities, as well as the time spent with the patient.

Time per household ranged from 2.3 hours for households where the initial referral was for venereal disease to 10.7 hours for those where the first referral was for cancer, cardiovascular disease, or other chronic disease (table 5). As might be expected the extremes for time

spent in direct service and in preactivity and postactivity were also found in these two categories, since any direct service requires a certain amount of preactivity and postactivity.

The proportion of time spent in direct service was fairly constant from one category to another, even though there was great variation in the amount of direct service. It ranged from 68 percent in households in the postpartum category to 76 percent in households in the category of cancer, cardiovascular disease, and other chronic disease.

Except for the postpartum and preschool categories, the initial patient received more than half of the time given to the household. The initial patient also received more time, on the average, than any individual additional patient except those in the postpartum category.

Comparison of tables 5 and 3 shows that the difference in the amount of service given to the initial patient and that to the additional patients is even more marked when time is considered rather than frequency of service.

Combination Agencies and Health Departments

Combination agencies have been defined in the National League for Nursing's Public Health Nursing Achievements and Goals as "a service jointly administered and jointly financed by official agencies (including boards of education)

Table 5. Hours of nursing service per household

Category of initial patient	Hours							Percent	
	Total	Pre- and post-activity	Direct service	Initial patient	Additional patients	Average for each additional patient	Ratio initial patient to additional patients	Initial patient	Additional patients
Orthopedic.....	5.0	1.3	3.7	4.0	1.0	1.0	4.0	80.0	20.0
Chronic disease ¹	10.7	2.5	8.2	9.8	.9	1.3	7.5	91.6	8.4
Communicable disease.....	3.9	1.1	2.8	2.3	1.6	1.4	1.6	59.0	41.0
Tuberculosis.....	6.8	1.6	5.2	4.7	2.1	1.0	4.7	69.1	30.9
Venereal disease.....	2.3	.7	1.6	1.8	.5	1.1	1.6	78.2	21.8
Infant.....	4.4	1.4	3.0	2.7	1.7	1.1	2.5	61.4	38.6
Preschool.....	3.5	1.0	2.5	1.5	2.0	1.2	1.2	42.8	57.2
School.....	3.5	1.0	2.5	2.2	1.3	1.4	1.6	62.8	37.2
Adult health.....	5.0	1.4	3.6	3.7	1.3	.7	5.3	74.0	26.0
Antepartum.....	7.3	1.9	5.4	4.5	2.8	1.6	2.8	61.6	38.4
Postpartum.....	5.3	1.7	3.6	1.9	3.4	2.0	1.0	35.8	64.2
Mental health.....	6.0	1.8	4.2	4.7	1.3	1.8	2.6	78.3	21.7
Noncommunicable disease.....	5.1	1.3	3.8	4.2	.9	1.1	3.8	82.4	17.6

¹ Includes cancer, cardiovascular, and other chronic diseases.

and voluntary agencies, with all field service rendered by a single group of public health nurses" while health departments are entirely tax supported.

These agencies differ in their policies as to the types and extent of the nursing service they provide.

Combination agencies assume more responsibility for long-term nursing care of the sick and disabled than do health departments. The combination agencies give nursing care of the sick and disabled as part of a continuing nursing service in homes, while health departments usually give such care only on a demonstration basis.

Because of differing policies, the data were examined according to the type of agency providing care (table 6). In general, the 3 combination agencies reported a few more additional patients than did the 5 health departments. Also, with the exception of venereal disease and child health supervision, the combination agencies reported more patient-nurse contacts per household. Finally, more time was spent by the combination agencies per household in every category except noncommunicable disease.

Summary and Discussion

In this study of 1,263 households and the public health nursing service they received,

three measurements have been used to describe the amount of service that ensues in a household as a result of the referral of the first patient. The first was the average number of additional patients per initial referral. This index was found to vary considerably with the service category of the first patient, and also appears to be virtually independent of the household size. In all service categories except tuberculosis, fewer than two additional patients were served per initial referral.

The second measurement was the number of patient-nurse contacts per household; the third, the number of hours spent in nursing service per household. Both of these measurements varied with the category of the initial patient and the variation was somewhat the same for the two measurements. This consistency in the variation was closely related to the fact that in most categories the initial patient received the majority of the patient-nurse contacts and the greater proportion of the time expended.

Time spent in preactivity and postactivity was studied as well as time spent in direct service to the patients. In all categories indirect service accounted for approximately 25 percent of the time expended, indicating that actual time with a patient or household is not the best measure for a work unit. A better one also takes into account the time spent for indirect service.

Table 6. Combination agencies and health departments

Category of initial patient	Number of initial patients		Index of additional patients		Patient-nurse contacts per household		Hours of service per household	
	Combination agency	Health department	Combination agency	Health department	Combination agency	Health department	Combination agency	Health department
Orthopedic	12	52	1.4	1.0	12.8	14.6	5.2	5.0
Chronic disease ¹	54	72	.8	.6	27.5	22.7	14.2	8.1
Communicable disease	44	48	1.1	1.1	13.6	11.2	3.9	3.9
Tuberculosis	57	121	2.1	2.0	27.1	21.8	7.8	6.4
Venereal disease	8	28	.0	.7	7.1	8.1	3.0	2.2
Infant	67	163	1.4	1.6	10.8	11.4	4.4	4.3
Preschool	20	27	1.7	1.7	10.9	12.2	3.9	3.3
School	21	50	1.1	.8	10.7	12.2	4.1	3.2
Adult health	2	2	2.5	1.0	22.0	13.0	7.2	2.9
Antepartum	61	99	1.9	1.6	22.8	16.9	8.4	6.7
Postpartum	43	68	1.6	1.6	16.1	11.8	5.6	5.1
Mental health	15	56	1.5	.6	16.2	15.2	6.7	5.9
Noncommunicable disease	41	32	1.0	.7	12.5	15.7	5.0	5.3

¹ Includes cancer, cardiovascular, and other chronic diseases.

The study staff made an effort to select those agencies and nurses that represented good public health nursing practices. If this was accomplished, the data presented in this report might be used in estimating personnel needs.

REFERENCE

- (1) Ferguson, M., and Westlake, J. E.: Participation of staffs of different agencies in data collection—A report on method. *Nursing Res.* 7: 23-26, February 1958.

Radioactivity Study

Milk samples have been analyzed for specific radionuclides in a continuing study conducted by the Public Health Service in milksheds serving Sacramento, Salt Lake City, St. Louis, Cincinnati, and New York City. Analyses to date find that manmade radioactivity on the average is but a small fraction of the recommended permissible maximum and is but slight even in relation to the natural radioactivity of milk. The study, which began in April 1957, is part of the Service's broad program in environmental analysis, including tests for radioactivity in water, air, and food.

Milk was the food selected for the initial study because of its importance in the diet and its year-round and widespread production. Radiation may be measured as a total or gross level, or it may be broken down to show the level of radiation from each specific radioactive element. Specific measurements, although much more difficult to make, are important because health effects vary greatly among specific elements. In addition, because milk normally contains natural radioactive potassium, the study undertook the separate measurement of radiation from specific manmade nuclides.

With the cooperation of State and municipal health agencies and the dairy industry, a monthly 1-gallon sample is collected at a designated point in each milkshed. The sample is a composite of a day's delivery by a group of dairy farms.

The sampling points were set up by the Service's

regional milk and food consultants in accordance with the following criteria:

- The milk in each composite sample must be from a group of farms having, altogether, at least 1,000 cows.
- The number of individual farms in the sample must be small enough to make collection of field data on each farm feasible.
- The composite milk sample must be from a supply that is part of a major metropolitan milkshed.
- The conditions under which the milk is received must be such that milk from the same production area is represented in the composite sample collected each month.

Collateral information also is collected concerning feeding practices, water supplies, and breeds of dairy cattle typical of each area.

The average levels of radioactivity found in samples collected during the first year of the pilot program are expressed here in units of micromicrocuries per liter of milk. A curie is a measure of radioactivity equivalent to that produced by one gram of radium, and a micromicrocurie is one-millionth of a millionth of a curie. The levels are shown in the table.

Additional sampling points are being established in the milksheds serving Atlanta, Ga.; Fargo, N. Dak., and Moorhead, Minn.; Austin, Tex.; and Spokane, Wash; and in a milkshed in southern Wisconsin.

First year's average levels of radioactivity in milk samples (micromicrocuries per liter)

City	Calcium (grams/ liter)	Iodine-131 (3,000)	Strontium- 89 (7,000)	Strontium- 90 (80.0)	Barium-140 (200,000)	Cesium-137 (50,000)
Sacramento.....	1. 128	35	14. 7	3. 4	19. 5	32. 8
Salt Lake City.....	1. 137	274	34. 0	3. 8	54. 0	43. 7
St. Louis.....	1. 250	275	78. 3	7. 4	98. 5	40. 3
Cincinnati.....	1. 254	132	45. 4	5. 1	39. 2	27. 3
New York City.....	1. 076	82	42. 4	5. 8	46. 8	29. 7

NOTE: Numbers in parentheses are the maximum permissible concentrations for the specific nuclides in drinking water recommended by the National Committee on Radiation Protection and Measurement.